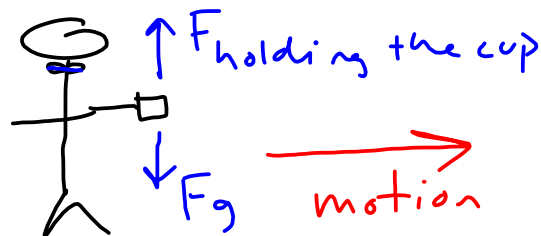
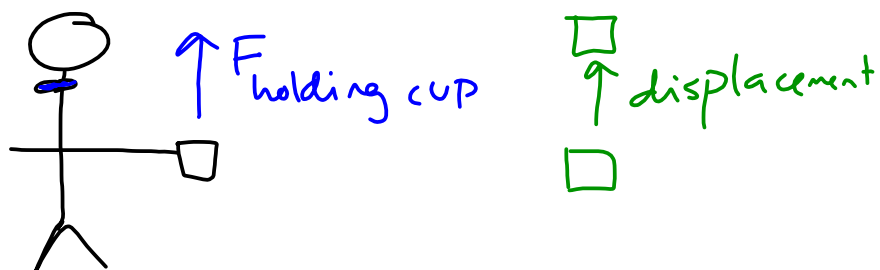


## Work:

- Using energy to do something
- When a force causes a change in motion of an object, and the force and the motion are in the same direction



- There is NO work in this scenario (force and displacement vectors are perpendicular)



- There IS work because force and displacement vectors are in the same direction

$$\text{Work} = (\text{Force})(\text{displacement})$$

$$W = Fd$$

Units:

$$\text{Joule} = (\text{Newton})(\text{meter}) = \text{N} \cdot \text{m}$$

$$= (\text{kg} \cdot \text{m}/\text{s}^2)(\text{m})$$

$$= \frac{\text{kg} \cdot \text{m}^2}{\text{s}^2}$$

$$\begin{aligned} 8) \quad \frac{W}{F} &= \frac{\cancel{F}d}{\cancel{F}} & W &= 170 \text{ J} \\ & & F &= 140 \text{ N} \\ d &= \frac{W}{F} & d &= ? \\ &= \frac{170 \text{ J}}{140 \text{ N}} \\ &= 1.21 \text{ m} \end{aligned}$$

$$\begin{aligned} a) \quad W &= Fd & F &= 100 \text{ N} \\ &= (100 \text{ N})(1 \text{ m}) & d &= 1 \text{ m} \\ &= 100 \text{ J} \end{aligned}$$

$$\begin{aligned} 12) \quad \frac{W}{d} &= \frac{\cancel{F}d}{\cancel{d}} & W &= 62500 \text{ J} \\ & & d &= 25 \text{ m} \\ & & F &= ? \\ F &= \frac{W}{d} \\ &= \frac{62500 \text{ J}}{25 \text{ m}} \\ &= 2500 \text{ N} \end{aligned}$$